



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/071,987

02/08/2002

Akira Takekuma

40004101-02

2039

7590

12/01/2004

Paul D. Greeley, Esq.
Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
10th Floor
One Landmark Square
Stamford, CT 06901-2682

EXAMINER

DOLAN, JENNIFER M

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/071,987

Applicant(s)

TAKEKUMA, AKIRA

Examiner

Jennifer M. Dolan

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-14 and 16-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4 and 5 is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-14 and 16-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 7-12, 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,331,063 to Kamada et al. in view of Japanese Patent Publication 2000323755 to Nozoe et al. (cited by applicant).

Regarding claims 1, 7, 8, 10, 11, and 14, Kamada discloses a light-emitting diode (see figures 1, 15, and 25) comprising: a unitary cup component (10); a plurality of electrical conducting traces (12, 17) formed on a surface of the cup component (see figures 1, 15, 25) using an MID means (column 3, line 40 – column 4, line 42); and a light-emitting diode chip (1) mounted on the cup component and electrically connected to at least a first and second electrical conducting trace (see figures 1, 15, 25).

Kamada is silent as to the leadframe/connection structure for providing electrical connections to the LEDs.

Nozoe teaches a LED package structure wherein the LED (1) is connected to traces (5, 6) formed within the molded cup (4), and a “connection part” comprising leads (3) and a portion of the traces (5b, 6b), where the conducting traces are respectively connected to first and second leads (3) which protrude from the cup component (see the figure) and are separate and distinct components from the first and second electric conducting traces (see the figure). Nozoe further

Art Unit: 2813

teaches that the cup includes conductive components (5b, 6b) linking to the first and second leads, and the leads include extension components (3a-1, 3b-1) that extend to the vicinity of the LED chip, the leads linking to an object on which the LED is held.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the LED structure of Kamada has a lead frame similar to that taught by Nozoe. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide a lead frame with separate and distinct projecting leads, because the LED of Kamada would require some sort of leadframe in order to deliver current to the LEDs such that they function, and since the leadframe structure taught by Nozoe is both notoriously common in the art and provides an easy connection with external circuitry. Additionally, a pair of leads connected underneath the mounting cup and connected to the LED by traces in the mounting cup, as is taught by Nozoe, provides the advantage of a reduced package size (see Nozoe, 'Solution' section in abstract). Finally, a person skilled in the art would appreciate that it would be advantageous to combine the lead structure taught by Nozoe with the surface MID traces in the structure of Kamada, because Kamada shows that MID-type surface traces allow for a thinned (height decreased) LED cup structure (Kamada, column 4, lines 43-51), as well as for the easy provision and interconnection of a plurality of LED chips, such that white-emission can be obtained (see Kamada, column 4, lines 25-65).

Regarding claim 2, Kamada discloses a plurality of LED chips located on the surface of the cup (see figure 1).

Regarding claims 9 and 17, Kamada discloses that the cup is a resin or ceramic material (see column 3, lines 50-55).

Art Unit: 2813

Regarding claim 12, Kamada discloses a plurality of LED chips (1) mounted on the cup component (figures 1, 25), each having a first and second electrode (an LED requires an N and a P electrode to function; also, in fig. 25: one electrode is on the bottom of each LED and the other is on the top), wherein three or more traces are used to provide electrical connections to the electrodes (traces 12 in figures 1 and 25).

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada et al. in view of Nozoe et al. as applied to claim 2 above, and further in view of U.S. Patent No. 5,914,501 to Antle et al.

Kamada fails to teach that a protective element that electrically protects the LED chip is provided.

Antle discloses an LED chip also having a protective element (12) provided in the cup (21), wherein the terminals of the protective element are respectively connected to the two terminals of the LED chip (see figures 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LED assembly of Kamada as modified by Nozoe, such that it includes a protective element as taught by Antle. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide a protective element in the cup, because doing so protects the LED from electrostatic discharge by clamping the applied voltage, thus preventing the LED from being damaged or destroyed by ESD (see Antle, column 1, lines 5-67). A person having ordinary skill would further have specified that the protection element be

Art Unit: 2813

connected to the conducting traces, because Antle shows that in order for the protection element to function, it must be connected in parallel to the LED chip (Antle, column 1, lines 25-35).

4. Claims 13, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada et al. in view of Nozoe et al., as applied to claim 12 above, and further in view of U.S. Patent No. 5,564,819 to Yamaguchi.

Regarding claim 13, it is not apparent in the combination of Kamada and Nozoe exactly how many traces and leads are being used to connect the three LED chips.

Yamaguchi teaches a LED structure having two LED chips (figures 1 and 5) with three leads and three electrical connections to the leads.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the combination of Kamada and Nozoe would need an individual lead connected to each LED electrical connection/trace, as suggested by Yamaguchi. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide separate electrical connections to each LED, such that the LED chips can emit separately, allowing for a full color display rather than simply a single color emission, as is appreciated by one skilled in the art (see Yamaguchi, column 1, lines 35-55). Since the electrical connections are provided by the leads, a person skilled in the art would recognize that a separate lead must be electrically connected to each of the LEDs through the traces in order to allow for individual LED operability.

Regarding claims 16 and 18, Kamada discloses a light-emitting diode (see figures 1, 15, and 25) comprising: a unitary cup component (10); a plurality of electrical conducting traces (12,

Art Unit: 2813

17) formed on a surface of the cup component (see figures 1, 15, 25) using an MID means (column 3, line 40 – column 4, line 42); and a light-emitting diode chip (1) mounted on the cup component and electrically connected to at least a first and second electrical conducting trace (see figures 1, 15, 25).

Kamada is silent as to the leadframe/connection structure for providing electrical connections to the LEDs. Kamada is further silent about a resin mold formation covering the components.

Nozoe teaches a LED package structure wherein the LED (1) is connected to traces (5, 6) formed within the molded cup (4), and a “connection part” comprising leads (3) and a portion of the traces (5b, 6b), where the conducting traces are respectively connected to first and second leads (3) which protrude from the cup component (see the figure) and are separate and distinct components from the first and second electric conducting traces (see the figure).

Yamaguchi teaches a resin molding (9) encapsulating the LED assembly (see figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the LED structure of Kamada has a lead frame similar to that taught by Nozoe, and that the assembly is covered by resin molding, as taught by Yamaguchi. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide a lead frame with separate and distinct projecting leads, because the LED of Kamada would require some sort of leadframe in order to deliver current to the LEDs such that they function, and since the leadframe structure taught by Nozoe is both notoriously common in the art and provides an easy connection with external circuitry. Additionally, a pair of leads connected underneath the mounting cup and connected to the LED by traces in the mounting

Art Unit: 2813

cup, as is taught by Nozoe, provides the advantage of a reduced package size (see Nozoe, 'Solution' section in abstract). Finally, a person skilled in the art would appreciate that it would be advantageous to combine the lead structure taught by Nozoe with the surface MID traces in the structure of Kamada, because Kamada shows that MID-type surface traces allow for a thinned (height decreased) LED cup structure (Kamada, column 4, lines 43-51), as well as for the easy provision and interconnection of a plurality of LED chips, such that white-emission can be obtained (see Kamada, column 4, lines 25-65). A person skilled in the art would further have been motivated to provide a resin molding encapsulation, because such structures are notoriously common in the art of LED packaging, and provide the advantages of protecting the LED components as well as enhancing the structural integrity of the package, as is appreciated by one having ordinary skill in the art.

5. Claims 1, 6-11, and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Publication 06-090029 to Itou et al (cited by applicant, hereafter Itou '029) in view of Japanese Patent Publication 07-007185 to Itou (Itou '185) and in view of Nozoe et al.

Regarding claims 1, 6, 9, 14, 17, and 18, Itou '029 discloses a light emitting diode (figure 1) comprising: a cup component (cup portion of 11 and 12); a plurality of electrical conducting traces (11a, 12a metallic layers) formed on a surface of the insulating cup (figures 1 and 2; paragraph 0007) using an MID means (since the cup is formed of 3-dimensional molded resin (see paragraph 0007) with conductive traces printed on the exterior (see figures 1 and 2), it is considered to have an MID construction); a LED chip (13) mounted on the bottom of the cup (figure 1) and electrically connected to first and second traces (figure 1); a first connection part

Art Unit: 2813

(11c and 12c) projecting from the cup and connected to the traces for providing electrical connections to external circuitry (paragraphs 0009, 0012, and 0013; it is implicit that since 11c, 11d, 12c, and 12d form a 'leadframe,' they clearly connect to external circuitry. Additionally, the LED would not be functional without connection to some sort of driving circuitry through the leads); and an outer mold substantially covering a bottom of the cup component (figure 5; also see figure 1). Insofar as Itou '029 suggests that the two halves of the cup are mechanically joined during fabrication of the assembly, the cup is considered to be unitary (see paragraph 0009).

Itou '029, however, fails to specifically state that the cup halves are joined into a unitary body. Itou further fails to teach that the leads are separate and distinct components from the first and second electric conducting traces.

Itou '185 teaches a substantially similar assembly wherein an LED chip is deposited into a recess at the bottom of a unitary cup (see figures 1 and 2).

Nozoe teaches that leads connected to an LED cup can simply be separate metal components (see the abstract figure).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the cup of Itou '029, such that it is unitary, as taught by Itou '185. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide a unitary cup, because both Itou publications show that a chip can be advantageously and equivalently pinched in a recess between a unitary cup or between two cup halves. From a fabrication standpoint, however, it is simpler to provide a unitary cup, since separate cup halves require additional fabrication steps, such as aligning and joining separate cup halves (see Itou

Art Unit: 2813

'029, paragraph 0009 and Itou '185, paragraph 0007-0009). A person skilled in the art would have further been motivated to use distinct and separate leads, because separately attached metal leads are notoriously old and common in the art of LED packaging, as is shown in Nozoe, and can easily replace the metal-coated integral leads of Itou '029. Also, it has been held that constructing a formerly integral structure in various or separable elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177,179, (CCPA 1969).

Regarding claim 7, Itou '029 discloses conductors (portions of metallic layer connecting 11a to 11c and 12a to 12c) that link to the first and second leads (figure 1).

Regarding claim 8, Itou '029 discloses an extension component (top portions of 17 in figure 4b) extending to the vicinity of the LED chip (figure 4b).

Regarding claim 10, Itou '029 discloses that the first connection part (11c, 12c) is of unitary construction with the first and second traces (portion of the metal layer at 11a and 12a), and thus comprises a portion of the traces.

Regarding claim 11, Itou '029 discloses conductors (figure 1), which link to an object on which the LED is held.

Regarding claim 15, Itou '029 discloses that the secondary assembly is connected to a lead component (figures 1 and 4; paragraphs 0009-0013).

Regarding claim 16, Itou '029 discloses that a resin mold (14; paragraph 0007) is formed to cover the parts from the outside (figure 1).

Art Unit: 2813

6. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itou '029 in view of Itou '185, and further in view of Nozoe et al., as applied to claim 1, supra, and even further in view of U.S. Patent No. 5,914,501 to Antle et al.

Itou '029 fails to disclose other electrical components on the surface of the cup and electrically connected to the traces, the other components including a protective element that electrically protects the LED chip.

Antle discloses an LED chip (14) also having a protective element (12) provided in the cup (21), wherein the terminals of the protective element are respectively connected to the two terminals of the LED chip (see figures 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LED assembly of Itou '029 in view of Itou '185 and Nozoe, such that it includes a protective element, as taught by Antle. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide a protective element in the cup, because doing so protects the LED from electrostatic discharge by clamping the applied voltage, thus preventing the LED from being damaged or destroyed by ESD (see Antle, column 1, lines 5-67). A person having ordinary skill would further have specified that the protection element be connected to the first and second conducting traces of Itou, because Antle shows that in order for the protection element to function, it must be connected in parallel to the LED chip (Antle, column 1, lines 25-35). Since the terminals of the LED chip are respectively connected to the first and second traces, then the terminals of the protection element must similarly be respectively connected to the first and second traces.

Art Unit: 2813

7. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itou '029 in view of Itou '185 and Nozoe et al, as applied to claim 1, supra, and further in view of U.S. Patent No. 5,564,819 to Yamaguchi.

Itou '029 fails to disclose a plurality of LED chips mounted on the cup, with three or more electrical traces and three or more leads corresponding to the traces.

Yamaguchi discloses an LED structure having two LED chips mounted in the same cup (figures 1 and 5), with each chip having top and bottom electrodes. Yamaguchi further discloses three leads, and wirebonds corresponding to the leads.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the structure of Itou '029 as modified by Itou '185 and Nozoe, such that a second LED chip, a third trace, and a third lead are provided, as suggested by Yamaguchi. The rationale is as follows: One of ordinary skill in the art at the time the invention was made would have been motivated to provide a second LED chip in the assembly, because doing so enables a single LED device to emit different colors (see Yamaguchi, column 1, lines 35-55). A person having ordinary skill in the art would then decide to use at least three leads and three traces in the multi-LED version of the device of Itou, because using three leads allows for independent operation of the two LED chips, rather than forcing both LEDs to emit simultaneously and at the same voltage. Since the traces are used to connect the LED chips to the leads, there must be at least three traces in order to allow for the independent connection of the LED electrodes to the three leads.

Allowable Subject Matter

8. Claims 4 and 5 are allowed.

Response to Arguments

9. Applicant's arguments with respect to claims 1, 14, and 18 have been considered but are moot in view of the new grounds of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 4,935,665 to Murata and U.S. Patent No. 5,660,461 to Ignatius et al. disclose alternate arrangements for mounting LED chips on metal traces in reflecting cups.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan
Examiner
Art Unit 2813

jmd



JACK CHEN
PRIMARY EXAMINER